

2022-23

CWRS Canada Western Red Spring



CWRS

Major Grading Factors

| | No. 1 | No. 2 | No. 3 | All Grades |
|--------------------------|------------|-------|-------|------------|
| Number of Samples Graded | 2207 | 362 | 41 | 2876 |
| % of all grades | 79.3 | 13.6 | 1.6 | 100 |
| Grading Factors* | % of grade | | | |
| Fusarium Damage | | | | |
| Ergot | | | | |
| Hard Vitreous Kernels | | | | |

Top Five CWRS Varieties Grown in 2022

- 1 AAC Brandon
- 2 AAC Viewfield
- 3 CDC Starbuck
- 4 AAC Wheatland
- 5 CDC Landmark

Source: Canadian Grain Commission

*A sample can be downgraded for more than one factor



CWRS

Protein Content, %

| Province | Mean | Standard Deviation |
|------------------------------|------|--------------------|
| No. 1 CWRS | | |
| Manitoba | 14.3 | 0.9 |
| Saskatchewan | 14.2 | 1.3 |
| Alberta and British Columbia | 13.5 | 1.3 |
| Western Canada | 14.0 | 1.3 |
| No. 2 CWRS | | |
| Manitoba | 14.0 | 0.9 |
| Saskatchewan | 13.5 | 1.5 |
| Alberta and British Columbia | 13.2 | 1.8 |
| Western Canada | 13.6 | 1.5 |
| All Grades | | |
| Manitoba | 14.3 | 0.9 |
| Saskatchewan | 14.1 | 1.4 |
| Alberta and British Columbia | 13.5 | 1.4 |
| Western Canada | 13.9 | 1.3 |

Grading factor and protein content analysis conducted by Canadian Grain Research Laboratory as of 11/03/2022, basis the Harvest Sample Program.

WESTERN COMPOSITE

No. 1 CWRS
Canada Western Red Spring

| Quality Parameter ^a | 2022 | 2021 |
|---|--------------------------------|------|
| | Western Composite ^b | |
| Wheat | | |
| Test Weight, kg/hL | 83.6 | 82.6 |
| Weight Per 1000 Kernels, g | 33.6 | 33.5 |
| Protein Content, % | 13.9 | 15.3 |
| Protein Content, % (dry matter basis) | 16.0 | 17.6 |
| Ash Content, % | 1.52 | 1.39 |
| Falling Number, s | 423 | 354 |
| Particle Size Index, % | 49 | 48 |
| Milling Flour Yield Bühler Laboratory Mill | | |
| Total Products Basis, % | 75.2 | 75.0 |
| 0.50% Ash Basis, % | 78.2 | 79.0 |

FIGURE 1
2022 Western Canadian CWRS Composite Regions



^a Data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour except Alveograph is on a 15.0% moisture basis and starch damage is as is.

^b Refer to crop region map (Figure 1, non-shaded area).

^c Break and shred received a higher score (+) as it was bigger compared to the 2020 composite.

n/a Not available (testing will not be conducted).

Harvest assessment composites represent grain available for export. Milling, analytical, and end product analysis conducted by Cereals Canada.

| Quality Parameter ^a | 2022 Western Composite ^b | | | 2021 Western Composite ^b | | |
|---|--|-------------|--------------|--|-------------|-------------------|
| | Flour | | | | | |
| | Straight Grade 75.2% | 74% | 60% | Straight Grade 75.0% | 74% | 60% |
| Extraction | | | | | | |
| Protein Content, % | 13.2 | 13.1 | 12.7 | 14.7 | 14.5 | 14.0 |
| Protein Loss, % | 0.7 | 0.8 | 1.2 | 0.6 | 0.8 | 1.3 |
| Wet Gluten Content, % | 36.5 | 36.5 | 33.5 | 38.0 | 38.3 | 37.5 |
| Gluten Index, % | 93 | 91 | 97 | 97 | 96 | 96 |
| Ash Content, % | 0.44 | 0.42 | 0.39 | 0.42 | 0.40 | 0.38 |
| Colour - L* | 85.1 | 85.0 | 85.7 | 84.5 | 84.8 | 85.5 |
| Starch Damage, UCD | 25.3 | 25.2 | 24.6 | 23.6 | 23.4 | 23.6 |
| Amylograph Peak Viscosity, BU | 710 | 764 | 801 | 466 | 491 | 497 |
| Farinograph | | | | | | |
| Absorption, % | 65.2 | 65.2 | 64.4 | 65.6 | 65.5 | 65.0 |
| Dough Development Time (DDT), min | 7.5 | 8.3 | 9.9 | 8.8 | 9.3 | 10.7 |
| Stability, min | 15.2 | 16.9 | 35.4 | 46.9 | 48.8 | 48.7 |
| Mixing Tolerance Index (MTI), BU | 18 | 14 | 8 | 10 | 10 | 2 |
| Extensograph (135 min) | | | | | | |
| Maximum Resistance (Rmax), BU | 563 | 632 | 737 | 754 | 733 | 817 |
| Extensibility (length), cm | 21.7 | 20.0 | 18.9 | 19.5 | 21.5 | 18.3 |
| Area, cm ² | 151 | 156 | 172 | 179 | 193 | 183 |
| Alveograph | | | | | | |
| P (height x 1.1), mm | 118 | 116 | 124 | 112 | 126 | 129 |
| L (length), mm | 152 | 143 | 141 | 115 | 132 | 125 |
| P/L | 0.78 | 0.81 | 0.88 | 0.97 | 0.95 | 1.03 |
| W, 10-4 J | 590 | 561 | 585 | 504 | 614 | 621 |
| Ie, % | 69.0 | 68.7 | 68.3 | 73.1 | 70.6 | 72.6 |
| Baking (No Time Dough) | | | | | | |
| Absorption, % | 69 | n/a | n/a | 69 | n/a | n/a |
| Mixing Time, min | 6.3 | n/a | n/a | 7.8 | n/a | n/a |
| Specific Volume, cm ³ /g | 7.9 | n/a | n/a | 8.3 | n/a | n/a |
| Total Bread Score (out of 10) | 9.1 | n/a | n/a | 9.2+ ^c | n/a | n/a |
| Baking (Sponge & Dough) | | | | | | |
| Absorption, % | 68 | n/a | 67 | 68 | n/a | 67 |
| Mixing Time, min | 8.4 | n/a | 8.6 | 9.1 | n/a | 9.5 |
| Specific Volume, cm ³ /g | 7.2 | n/a | 7.1 | 7.3 | n/a | 7.6 |
| Total Bread Score (out of 10) | 9.5 | n/a | 9.9 | 9.5 | n/a | 9.7+ ^c |
| Noodles (Fresh Yellow Alkaline) | | | | | | |
| Colour (3h / 24h) L* | n/a | 74.2 / 69.3 | 74.8 / 71.0 | n/a | 72.8 / 68.2 | 74.5 / 70.2 |
| a* | n/a | 0.15 / 0.69 | -0.10 / 0.44 | n/a | 0.34 / 0.80 | 0.20 / 0.56 |
| b* | n/a | 26.5 / 24.9 | 26.3 / 25.2 | n/a | 25.1 / 23.5 | 25.2 / 23.9 |
| Cooked Noodle Max. Cutting Stress g/mm² | | | | | | |
| Cook Time - 3.5 min | n/a | 37.1 | 36.3 | n/a | 37.7 | 35.4 |
| Noodles (Fresh White Salted) | | | | | | |
| Colour (3h / 24h) L* | n/a | 75.7 / 72.2 | 76.9 / 73.8 | n/a | 74.4 / 70.9 | 75.6 / 72.5 |
| a* | n/a | 1.73 / 2.16 | 1.43 / 1.66 | n/a | 2.00 / 2.41 | 1.71 / 1.95 |
| b* | n/a | 25.3 / 24.9 | 25.5 / 25.2 | n/a | 23.7 / 23.1 | 23.9 / 23.3 |
| Cooked Noodle Max. Cutting Stress g/mm² | | | | | | |
| Cook Time - 3.5 min | n/a | 28.5 | 26.1 | n/a | 27.0 | 25.1 |

EASTERN COMPOSITE

No. 1 CWRS
Canada Western Red Spring

| Quality Parameter ^a | 2022 Eastern Composite ^b | 2021 Eastern Composite ^b |
|---|-------------------------------------|-------------------------------------|
| Wheat | | |
| Test Weight, kg/hL | 83.4 | 81.4 |
| Weight Per 1000 Kernels, g | 33.0 | 32.7 |
| Protein Content, % | 14.4 | 15.3 |
| Protein Content, % (dry matter basis) | 16.6 | 17.7 |
| Ash Content, % | 1.60 | 1.43 |
| Falling Number, s | 393 | 340 |
| Particle Size Index, % | 51 | 49 |
| Milling Flour Yield Bühler Laboratory Mill | | |
| Total Products Basis, % | 76.3 | 76.0 |
| 0.50% Ash Basis, % | 77.3 | 79.0 |

FIGURE 1
2022 Western Canadian CWRS Composite Regions



^a Data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour except Alveograph is on a 15.0% moisture basis and starch damage is as is.

^b Refer to crop region map (Figures 1, shaded area)

^c Break and shred received a higher score (+) as it was bigger compared to the 2020 composite.

n/a = Not available (testing will not be conducted).

Harvest assessment composites represent grain available for export. Milling, analytical, and end product analysis conducted by Cereals Canada.

| Quality Parameter ^a | 2022 Eastern Composite ^b | | 2021 Eastern Composite ^b | |
|---|-------------------------------------|-------------|-------------------------------------|-------------|
| Flour | | | | |
| Extraction | Straight Grade 76.3% | 74% | Straight Grade 76.0% | 74% |
| Protein Content, % | 13.5 | 13.3 | 14.3 | 14.2 |
| Protein Loss, % | 0.9 | 1.1 | 1.0 | 1.1 |
| Wet Gluten Content, % | 36.3 | 36.0 | 38.2 | 37.6 |
| Gluten Index, % | 95 | 95 | 97 | 98 |
| Ash Content, % | 0.48 | 0.43 | 0.44 | 0.39 |
| Colour - L* | 84.7 | 85.2 | 84.5 | 85.0 |
| Starch Damage, UCD | 24.5 | 24.3 | 23.1 | 22.6 |
| Amylograph Peak Viscosity, BU | 593 | 592 | 526 | 558 |
| Farinograph | | | | |
| Absorption, % | 64.9 | 64.5 | 63.5 | 63.4 |
| Dough Development Time (DDT), min | 7.4 | 7.1 | 8.7 | 8.7 |
| Stability, min | 11.6 | 13.5 | 43.8 | 50.1 |
| Mixing Tolerance Index (MTI), BU | 27 | 22 | 17 | 16 |
| Extensograph (135 min) | | | | |
| Maximum Resistance (Rmax), BU | 523 | 583 | 608 | 720 |
| Extensibility (length), cm | 23.0 | 22.6 | 24.1 | 22.7 |
| Area, cm ² | 152 | 167 | 188 | 196 |
| Alveograph | | | | |
| P (height x 1.1), mm | 97 | 102 | 106 | 105 |
| L (length), mm | 169 | 178 | 143 | 134 |
| P/L | 0.57 | 0.57 | 0.74 | 0.78 |
| W, 10-4 J | 507 | 572 | 578 | 552 |
| le, % | 66.9 | 68.5 | 73.1 | 73.0 |
| Baking (No Time Dough) | | | | |
| Absorption, % | 68 | n/a | 67 | n/a |
| Mixing Time, min | 6.6 | n/a | 7.8 | n/a |
| Specific Volume, cm ³ /g | 7.5 | n/a | 8.2 | n/a |
| Total Bread Score (out of 10) | 9.4 | n/a | 9.6 | n/a |
| Baking (Sponge & Dough) | | | | |
| Absorption, % | 67 | n/a | 66 | n/a |
| Mixing Time, min | 7.7 | n/a | 9.6 | n/a |
| Specific Volume, cm ³ /g | 7.4 | n/a | 7.7 | n/a |
| Total Bread Score (out of 10) | 9.7 | n/a | 9.6+ ^c | n/a |
| Noodles (Fresh Yellow Alkaline) | | | | |
| Colour (3h / 24h) L* | n/a | 72.7 / 69.0 | n/a | 74.1 / 69.1 |
| a* | n/a | 0.45 / 0.79 | n/a | 0.30 / 0.65 |
| b* | n/a | 26.0 / 25.0 | n/a | 25.0 / 23.5 |
| Cooked Noodle Max. Cutting Stress g/mm² | | | | |
| Cook Time - 3.5 min | n/a | 35.0 | n/a | 36.9 |
| Noodles (Fresh White Salted) | | | | |
| Colour (3h / 24h) L* | n/a | 74.8 / 71.7 | n/a | 75.2 / 72.0 |
| a* | n/a | 2.06 / 2.47 | n/a | 2.11 / 2.36 |
| b* | n/a | 24.9 / 24.4 | n/a | 23.8 / 23.0 |
| Cooked Noodle Max. Cutting Stress g/mm² | | | | |
| Cook Time - 3.5 min | n/a | 26.3 | n/a | 26.5 |

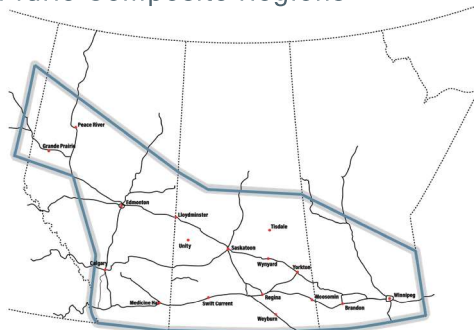
PRAIRIE COMPOSITE

No. 2 CWRS
Canada Western Red Spring

| Quality Parameter ^a | 2022 Prairie Composite ^b | 2021 |
|---------------------------------------|--|------|
| Wheat | | |
| Test Weight, kg/hL | 81.2 | 80.7 |
| Weight Per 1000 Kernels, g | 34.3 | 34.0 |
| Protein Content, % | 13.8 | 14.8 |
| Protein Content, % (dry matter basis) | 16.0 | 17.1 |
| Ash Content, % | 1.57 | 1.42 |
| Falling Number, s | 352 | 308 |
| Particle Size Index, % | 53 | 48 |

| Milling Flour Yield Bühler Laboratory Mill | | |
|--|------|------|
| Total Products Basis, % | 75.2 | 75.7 |
| 0.50% Ash Basis, % | 77.2 | 79.2 |

FIGURE 2
2022 Western Canadian Prairie Composite Regions



^a Data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour except Alveograph is on a 15.0% moisture basis and starch damage is as is.

^b Refer to crop region map (Figure 2).

^c Break and shred received a higher score (+) as it was bigger compared to the 2020 composite.

n/a Not available (testing will not be conducted).

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| Quality Parameter ^a | 2022 Prairie Composite ^b | 2021 Prairie Composite ^b |
|---|--|--|
| Flour | | |
| Extraction | Straight Grade 75.2% | Straight Grade 75.5% |
| Protein Content, % | 12.9 | 13.9 |
| Protein Loss, % | 0.9 | 0.9 |
| Wet Gluten Content, % | 35.0 | 36.8 |
| Gluten Index, % | 98 | 97 |
| Ash Content, % | 0.46 | 0.43 |
| Colour - L* | 85.0 | 84.1 |
| Starch Damage, UCD | 24.6 | 23.5 |
| Amylograph Peak Viscosity, BU | 407 | 350 |
| Farinograph | | |
| Absorption, % | 63.4 | 64.0 |
| Dough Development Time (DDT), min | 6.3 | 7.0 |
| Stability, min | 14.0 | 15.7 |
| Mixing Tolerance Index (MTI), BU | 17 | 16 |
| Extensograph (135 min) | | |
| Maximum Resistance (Rmax), BU | 612 | 510 |
| Extensibility (length), cm | 21.9 | 25.1 |
| Area, cm ² | 171 | 161 |
| Alveograph | | |
| P (height x 1.1), mm | 98 | 107 |
| L (length), mm | 169 | 100 |
| P/L | 0.58 | 1.07 |
| W, 10-4 J | 536 | 431 |
| Ie, % | 67.9 | 72.3 |
| Baking (No Time Dough) | | |
| Absorption, % | 67 | 67 |
| Mixing Time, min | 6.6 | 7.4 |
| Specific Volume, cm ³ /g | 7.7 | 8.0 |
| Total Bread Score (out of 10) | 9.5 | 9.0+ ^c |
| Baking (Sponge & Dough) | | |
| Absorption, % | 66 | 66 |
| Mixing Time, min | 8.1 | 8.7 |
| Specific Volume, cm ³ /g | 7.7 | 7.8 |
| Total Bread Score (out of 10) | 9.6 | 9.3+ ^c |
| Noodles (Fresh Yellow Alkaline) | | |
| Colour (3h / 24h) L* | n/a | n/a |
| a* | n/a | n/a |
| b* | n/a | n/a |
| Cooked Noodle Max. Cutting Stress g/mm² | | |
| Cook Time - 3.5 min | n/a | n/a |
| Noodles (Fresh White Salted) | | |
| Colour (3h / 24h) L* | n/a | n/a |
| a* | n/a | n/a |
| b* | n/a | n/a |
| Cooked Noodle Max. Cutting Stress g/mm² | | |
| Cook Time - 3.5 min | n/a | n/a |